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# FEE TRANSMITTAL for FY 2002

Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 0.00

## Complete if Known

Application Number	09/172,298
Filing Date	October 14, 1998
First Named Inventor	Howard E. Rhodes
Examiner Name	G. Munson
Group Art Unit	2811
Attorney Docket No.	M4065.0101/P101

## METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None  
☐ Deposit Account

Deposit Account Number

04-1073

Deposit Account Name

Dickstein Shapiro Morin & Oshinsky LLP

The Commissioner is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☒ Credit any overpayments  
☐ Charge any additional fee(s) during the pendency of this application  
☐ Charge fee(s) indicated below, except for the filing fee

to the above-identified deposit account.

## FEE CALCULATION

### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
101	740	201	370	Utility filing fee	
106	330	206	165	Design filing fee	
107	510	207	255	Plant filing fee	
108	740	208	370	Reissue filing fee	
114	160	214	80	Provisional filing fee	

SUBTOTAL (1) (\$) 0.00

### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims 92 -92\*\* =  x  = 0.00  
Independent Claims 5 -5\*\* =  x  = 0.00  
Multiple Dependent  x  =

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
103	18	203	9	Claims in excess of 20
102	84	202	42	Independent claims in excess of 3
104	280	204	140	Multiple dependent claim, if not paid
109	84	209	42	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) 0.00

\*\*or number previously paid, if greater; For Reissues, see above

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for ex parte reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	920	217	460	Extension for reply within third month	
118	1,440	218	720	Extension for reply within fourth month	
128	1,960	228	980	Extension for reply within fifth month	
119	320	219	160	Notice of Appeal	
120	320	220	160	Filing a brief in support of an appeal	
121	280	221	140	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,280	241	640	Petition to revive - unintentional	
142	1,280	242	640	Utility issue fee (or reissue)	
143	460	243	230	Design issue fee	
144	620	244	310	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Processing fee under 37 CFR 1.17(q)	
126	180	126	180	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	740	246	370	Filing a submission after final rejection (37 CFR 1.129(a))	
149	740	249	370	For each additional invention to be	
179	740	279	370	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify) \_\_\_\_\_

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 0.00

## SUBMITTED BY

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Signature

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Date May 15, 2002



#56/Recons. Letter.  
5-23-02  
R. Graleno

Docket No.: M4065.0101/P101  
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
Howard E. Rhodes

Application No.: 09/172,298

Group Art Unit: 2811

Filed: October 14, 1998

Examiner: G. Munson

For: CMOS IMAGER HAVING A NITRIDE  
DIELECTRIC

REQUEST FOR RECONSIDERATION

Box AF  
Commissioner for Patents  
Washington, DC 20231

Dear Sir:

RECEIVED  
MAY 17 2002  
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Responsive to the Office Action dated February 15, 2002 (Paper No. 25), please reconsider the above-identified U.S. Patent application in light of the following remarks.

35 U.S.C. § 112, First Paragraph

Claim 66 remains rejected under 35 U.S.C. § 112, first paragraph. The Office Action asserts that “[t]he ‘processor’ (claim 53) for particular use in a ‘camera’ is unclear from the specification (page 19).”

As explained in each of Applicant’s previous two responses, Applicant respectfully submits that the meaning of the claimed “processor” (claim 53) for use in a “camera” (claim 66) would be evident to any person skilled in the art from the context of the disclosure at specification page 18, line 28, through page 19, line 21. Applicant discloses

that “[t]he illustrated system is exemplary of a device having digital circuits which include CMOS imager devices,” and that “[o]ther types of processor systems which include the same or similar systems of FIG. 11 include cameras, scanners, machine vision systems . . .”

Applicant submits that it would be abundantly clear to any person skilled in the art that the “processor” required for use in the claimed camera is a means for executing instructions, or programs having instructions, often known as a central processing unit (CPU), or often simply described as a “processor.” Secondly, the meaning of a processor for use in a camera would be clear from the background disclosure at specification page 4, line 26, through page 5, line 3, where Applicant discloses, for example, the description in Nixon et al., “256 x 256 CMOS Active Pixel Sensor Camera-on-a-Chip,” IEEE Journal of Solid-State Circuits, Vol. 31(12) pp. 2046-2050, 1996. The “processor” required for use in the claimed camera is a means for executing instructions, or for executing programs having instructions, that functions to operate the camera.

Contrary to the assertion in the Office Action (page 5), Applicant is not “incorporat[ing] essential material for the ‘processor’ of claim 66 by reference to the Nixon et al. paper.” Claim 53 defines a system that comprises, *inter alia*, a “processor for processing image data.” Claim 66 defines the “system” of claim 53 to be a “camera.” Applicant relies upon the Nixon reference simply to establish that the meaning of a processor for use in a camera would be readily understood by one skilled in the art, and that no further description of such an embodiment is required to enable one to practice the invention.

Reconsideration and withdrawal, therefore, of the rejection of claim 66 under § 112, first paragraph, are respectfully requested.

35 U.S.C. § 102 – Anagnostopoulos

Claims 1-4 and 7-13 stand rejected under 35 U.S.C. § 102 as allegedly being anticipated by U.S. Patent No. 5,804,845 to Anagnostopoulos et al. (hereinafter “Anagnostopoulos”).

As stated in Applicant’s response filed December 17, 2001, for at least the following reasons, the disclosure of Anagnostopoulos does not anticipate Applicant’s claimed invention, as is required to support a § 102 rejection.

The Office Action relies upon Figs. 2A, 3B, and 3C of Anagnostopoulos. The cited reference does not identically describe Applicant’s claimed invention because it fails to disclose the claimed “nitrogen containing insulating layer in contact with said substrate and beneath said photogate” (emphasis added). The embodiment depicted in Anagnostopoulos’ Fig. 2A is described as having a “substrate 24, . . . with an epitaxial layer 26 that is of a lesser doped p-type material formed thereon” (column 3, lines 56-58). Anagnostopoulos fails to disclose Applicant’s claimed nitrogen containing insulating layer in contact with the substrate. The embodiment depicted in Anagnostopoulos’ Fig. 3B is described as having “top oxide layer 41, nitride layer 42, and bottom oxide layer 43” (column 5, lines 17-19). Thus, in the embodiment of Anagnostopoulos depicted in Fig. 3B, it is the oxide layer 43 which is in contact with the substrate, i.e., the nitride layer is separated from the substrate by oxide layer 43. Even the prior art disclosed in

Anagnostopoulos (Fig. 3C) discloses that SiO<sub>2</sub> layer 52 is located between the substrate and the nitride layer 51.

None of the embodiments of Anagnostopoulos relied upon in the Office Action anticipates Applicant's claimed invention.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 1-4 and 7-13 under § 102 are respectfully requested.

35 U.S.C. § 103 – “Acknowledged Prior Art” and Nagasaki

Claims 1-3, 7, 12, 14, 15, 18, 19, 25, 26, 28, 29, 31-33, 38, 39, 41, 44, 46, 51, 53-55, 57-59, 66, 115-124, and 135-139 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over “the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al., considered together.”

The rejection is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the rejected claims.

The claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings to attain the claimed invention.

With regard to Applicant's claim 1, the asserted combination fails to suggest Applicant's claimed imaging device comprising a “nitrogen containing insulating layer in contact with said substrate and beneath said photogate.”

It is respectfully submitted that the disclosure of Nagasaki cannot compensate for the deficiency of “the acknowledged prior art.” Nagasaki discloses a solid-state imaging device containing an insulating film made of “a high dielectric material having a *high* relative dielectric constant” (column 11, lines 20-22)(emphasis added). The Office Action suggests that from Nagasaki (Figure 17; columns 2-3) it would have been obvious to use an insulator with a higher dielectric constant in order to increase the capacity of the photogate.

However, while Nagasaki teaches the use of a high dielectric material, it also specifically teaches that silicon oxide and silicone nitride are *low* dielectric constant materials, while antiferroelectrics and ferroelectrics are high dielectric materials (column 3, lines 20-28). Nagasaki then proceeds to unequivocally and repeatedly exclude the use of low dielectric materials, including silicone oxide and silicone nitride, in its invention (column 4, line 57; column 5, line 42; column 6, line 33; column 6, lines 57-59; etc.)

As established above, by teaching the use of a material having a *high* relative dielectric constant, Nagasaki clearly teaches away from using nitrogen containing insulating materials. Nagasaki thus teaches away from Applicant’s claimed invention. From the teaching of Nagasaki, therefore, it is not plausible to suggest that one of ordinary skill in the art would have used Applicant’s claimed nitrogen containing material in place of a silicon oxide.

The Office Action asserts that it would have been obvious to use an insulator with a higher dielectric constant to increase the capacity of the photogate. No reference is

cited, however, which suggests the use of a nitrogen containing insulating layer in the location claimed. Nagasaki does not teach or suggest that a nitrogen containing insulating layer would be useful for any purpose in the location claimed, much less to achieve the improved signal acquisition, wider dynamic range, and improved signal to noise ratio discussed, for example, at page 13, lines 10-20, and page 18, lines 20-24, of the specification.

Nagasaki *teaches* the use of “a high dielectric material having a *high* relative dielectric constant” (column 1, lines 65-66). In Table 1 (column 3), Nagasaki discloses that “SiO<sub>2</sub>” is a “low dielectric material” with a relative dielectric constant of 4.5, and that “Si<sub>3</sub>N<sub>4</sub>” is a “low dielectric material” with a relative dielectric constant of 10. Every other entry in Table 1, none of which includes nitrogen, is described as a “high dielectric material.”

Therefore, simply because Si<sub>3</sub>N<sub>4</sub> has a higher relative dielectric constant than SiO<sub>2</sub>, does not mean that the nitrogen containing Si<sub>3</sub>N<sub>4</sub> would be acceptable to Nagasaki. Nagasaki teaches the use of “a high dielectric material having a *high* relative dielectric constant,” and the only nitrogen containing material in Table 1, Si<sub>3</sub>N<sub>4</sub>, is described by Nagasaki as being “a *low* dielectric material.”

Thus, the asserted combination would not have rendered obvious the various embodiments of the invention defined by any of Applicant's rejected independent claims. The rejected dependent claims are allowable along with the aforementioned independent claims, and on their own merits.

Claim 14 recites an “imaging device including a semiconductor integrated circuit substrate . . . comprising . . . a nitrogen containing insulating material in contact with said substrate and beneath said photogate.” Applicant submits that claim 14 is allowable for the same reasons outlined above for allowance of claim 1.

Claims 15, 18, 19, 25, 26, and 116 are dependent upon claim 14, and contain all the limitations of claim 14. Claims 15, 18, 19, 25, 26, and 116 are believed to be in immediate condition for allowance for those reasons outlined above for the allowance of claim 14, and also because the unique combinations recited in these dependent claims are neither taught nor suggested by the cited combination of references.

Claim 28 recites “an imaging system comprising . . . wherein a nitrogen containing insulating layer is in contact with said substrate and beneath said photogate.” Applicant submits that claim 28 is allowable for the same reasons outlined above for allowance of claim 1.

Claims 29, 31-33, 38, and 117 are dependent upon claim 28, and contain all the limitations of claim 28. Claims 29, 31-33, 38, and 117 are believed to be in immediate condition for allowance for those reasons outlined above for the allowance of claim 28, and also because the unique combinations recited in these dependent claims are neither taught nor suggested by the cited combination of references.

Claim 39 recites “an imaging system . . . wherein a nitrogen containing insulating layer is in contact with said substrate and beneath said photogate.” Applicant



submits that claim 39 is allowable for the same reasons outlined above for allowance of claim 1.

Claims 41-44, 51, and 118 are dependent upon claim 39, and contain all the limitations of claim 39. Claims 41-44, 51, and 118 are believed to be in immediate condition for allowance for those reasons outlined above for the allowance of claim 39, and also because the unique combinations recited in these dependent claims are neither taught nor suggested by the cited combination of references.

Claim 53 recites a “system comprising . . . a CMOS imaging device . . . including . . . a nitrogen containing insulating layer in contact with said substrate and beneath said photogate.” Applicant submits that claim 53 is allowable for the same reasons outlined above for allowance of claim 1.

Claims 54-55, 57-59, and 119 are dependent upon claim 53, and contain all the limitations of claim 53. Claims 54-55, 57-59, and 119 are believed to be in immediate condition for allowance for those reasons outlined above for the allowance of claim 53, and also because the unique combinations recited in these dependent claims are neither taught nor suggested by the cited combination of references.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 1-3, 7, 12, 14, 15, 18, 19, 25, 26, 28, 29, 31-33, 38, 39, 41, 44, 46, 51, 53-55, 57-59, 66, 115-124, and 135-139 under § 103 are respectfully requested.

35 U.S.C. § 103 – “Acknowledged Prior Art” and Nagasaki, with Koike

Claims 4, 27, 45, 56, 125-134 and 140-144 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over “the acknowledged prior art in this application (Figures 1, 2, pages 1-12) and Nagasaki et al., further considered together with Koike et al.”

The rejection is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the rejected claims.

For all of the reasons identified above with respect to the rejection over the acknowledged prior art and Nagasaki, the claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings to attain the claimed invention.

Furthermore, it is respectfully submitted that the disclosure of Koike cannot compensate for the above-described deficiency of Nagasaki. The independent claims from which claims 4, 27, 45, 56, and 120-129 depend recite a nitrogen containing insulating layer in contact with the substrate and beneath the photogate. Koike does not suggest a nitrogen containing insulating layer. For this reason alone, claims 4, 27, 45, 56, and 120-129 are allowable over the asserted combination.

Because Koike does not remedy Nagasaki’s deficiency associated with the use of silicon nitride or other nitrogen containing insulating material, it cannot be construed as also teaching any of the structural configurations set forth in claims 120-129. Claims 120-

129 recite a “gate stack over [a] substrate and beneath [a nitrogen containing] insulating layer.” Nagasaki does not teach an insulating layer over any structure that can be comparable to a gate stack.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 4, 27, 45, 56, 125-134 and 140-144 under § 103 are respectfully requested.

35 U.S.C. § 103 – “Acknowledged Prior Art” and Nagasaki, with Suzuki

Claims 8, 10, 11, 20, 22, 23, 34, 36, 37, 47, 49, 50, 60, 62 and 63 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the acknowledged prior art (Figures 1, 2, pages 1-12) and Nagasaki, further considered together with Suzuki.

The rejection is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the rejected claims.

For all of the reasons identified above with respect to the rejection over the acknowledged prior art and Nagasaki, the claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings to attain the claimed invention.

Furthermore, it is respectfully submitted that the disclosure of Suzuki cannot compensate for the above-described deficiency of Nagasaki. The independent claims from which claims 8, 10, 11, 20, 22, 23, 34, 36, 37, 47, 49, 50, 60, 62 and 63 depend recite a nitrogen containing insulating layer in contact with the substrate and beneath the

photogate. Suzuki does not teach the use of a nitrogen containing insulating layer at the location claimed as opposed to a silicon oxide layer. For this reason alone, claims 8, 10, 11, 20, 22, 23, 34, 36, 37, 47, 49, 50, 60, 62 and 63 are allowable over the asserted combination.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 8, 10, 11, 20, 22, 23, 34, 36, 37, 47, 49, 50, 60, 62 and 63 under § 103 are respectfully requested.

35 U.S.C. § 103 – “Acknowledged Prior Art,” Nagasaki, Okada, and Anagnostopoulos

Claims 1-4, 7-15, 18-23, 25-29, 31-39, 41-63, 65, 66, 115-124, and 135-139 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the acknowledged prior art (Figures 1, 2, pages 1-12) and Nagasaki, further considered together with Okada and Anagnostopoulos.

The rejection is respectfully traversed. The combined disclosures would not have rendered obvious the embodiments of the invention defined by any of the rejected claims.

For all of the reasons identified above with respect to the rejection over the acknowledged prior art and Nagasaki, the claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings to attain the claimed invention.

Furthermore, it is respectfully submitted that the disclosures of Okada and Anagnostopoulos cannot compensate for the above-described deficiency of Nagasaki. Even if Okada teaches ONO, Okada does not teach or suggest the structure claimed. The independent claims from which claims 8, 9, 13, 20, 21, 34, 35, 47, 48, 52, 60, 61 and 65 depend recite a nitrogen containing insulating layer in contact with a substrate and beneath a photogate. Neither Okada nor Anagnostopoulos, however, teaches Applicant's claimed nitrogen containing insulating layer in contact with a substrate and beneath a photogate. For this reason alone, the rejected claims are allowable over the asserted combination.

For at least the above reasons, reconsideration and withdrawal of the rejection of claims 1-4, 7-15, 18-23, 25-29, 31-39, 41-63, 65, 66, 115-124, and 135-139 under § 103 are respectfully requested.

35 U.S.C. § 103 – “Acknowledged Prior Art,” Nagasaki, Okada, Anagnostopoulos, and Koike

Claims 125-134 and 140-144 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the acknowledged prior art (Figures 1, 2, pages 1-12) Nagasaki, Okada, and Anagnostopoulos, further considered together with Koike.

The rejection is respectfully traversed. For all of the reasons identified above, the claimed invention would not have been obvious because there is no suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings to attain the claimed invention.

It is respectfully submitted that the disclosure of Koike cannot compensate for the above-described deficiencies of the other applied references. Applicant's independent claims from which claims 125-134 and 140-144 depend recite a nitrogen containing insulating layer in contact with the substrate and beneath the photogate. Koike does not suggest Applicant's claimed nitrogen containing insulating layer configuration.

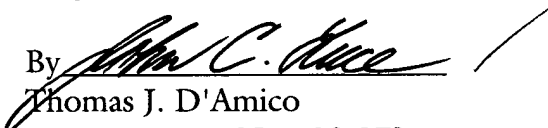
For at least the above reasons, reconsideration and withdrawal of the rejection of claims 125-134 and 140-144 under § 103 are respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: May 15, 2002

Respectfully submitted,

By

  
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